Title: **Data Cleaning and Visualization of Healthcare Dataset**

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Introduction:

Healthcare data is crucial for medical analysis, decision-making, and research. However, raw data often contains missing values, inconsistencies, and duplicates, which can lead to inaccurate results. This report details the process of cleaning healthcare data using Python, ensuring accuracy and reliability in medical datasets.

Methodology:

The data cleaning process follows these steps

Loading Data: The dataset is loaded into a Pandas DataFrame.

Handling Missing Values: Checking and filling missing values with appropriate measures (e.g., median for numerical data, mode for categorical data).

Removing Duplicates: Identifying and eliminating duplicate records.

Normalizing Data: Using Min-Max Scaling to bring numerical values to a standardized scale (0 to 1).

Visualization: Generating histograms to analyse the distribution of cleaned data.

Saving Cleaned Data: Exporting the cleaned dataset to a CSV file for further use.

CODE TYPED:

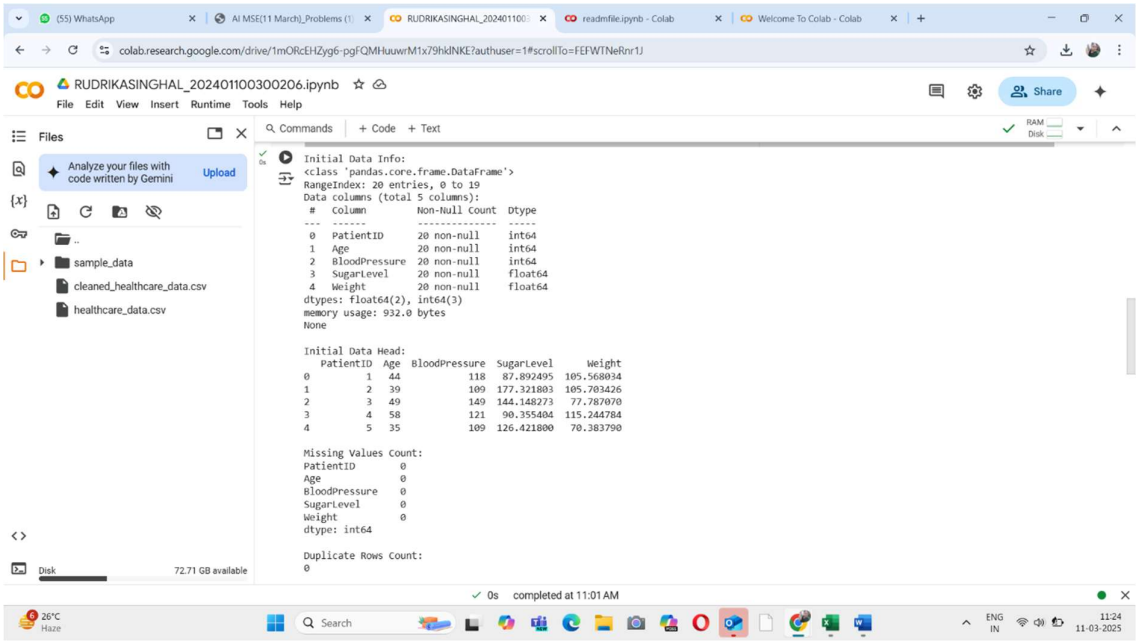
```
import pandas as pd                #import python library

import numpy as np                 #import numpy library for data analytics

import matplotlib.pyplot as plt    #import matplotlib library for graph plotting

import seaborn as sms              #import seaborn library for statistical graphics

df=pd.read_csv('/content/healthcare_data.csv')    #insert or read the data set in a file

from sklearn.preprocessing import MinMaxScaler, LabelEncoder


# Create the DataFrame from the provided data

data = pd.DataFrame({

    'PatientID': [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20],

    'Age': [44, 39, 49, 58, 35, 25, 46, 28, 60, 55, 41, 48, 58, 35, 67, 70, 43, 74, 19, 56],

    'BloodPressure': [118, 109, 149, 121, 109, 129, 132, 93, 145, 125, 143, 141, 93, 145, 176, 109, 148, 122, 147, 119],

    'SugarLevel': [87.89249492, 177.321803, 144.1482732, 90.35540377, 126.4218, 95.27311377, 146.6077185, 109.7549862, 103.1938308, 197.7263558,
```

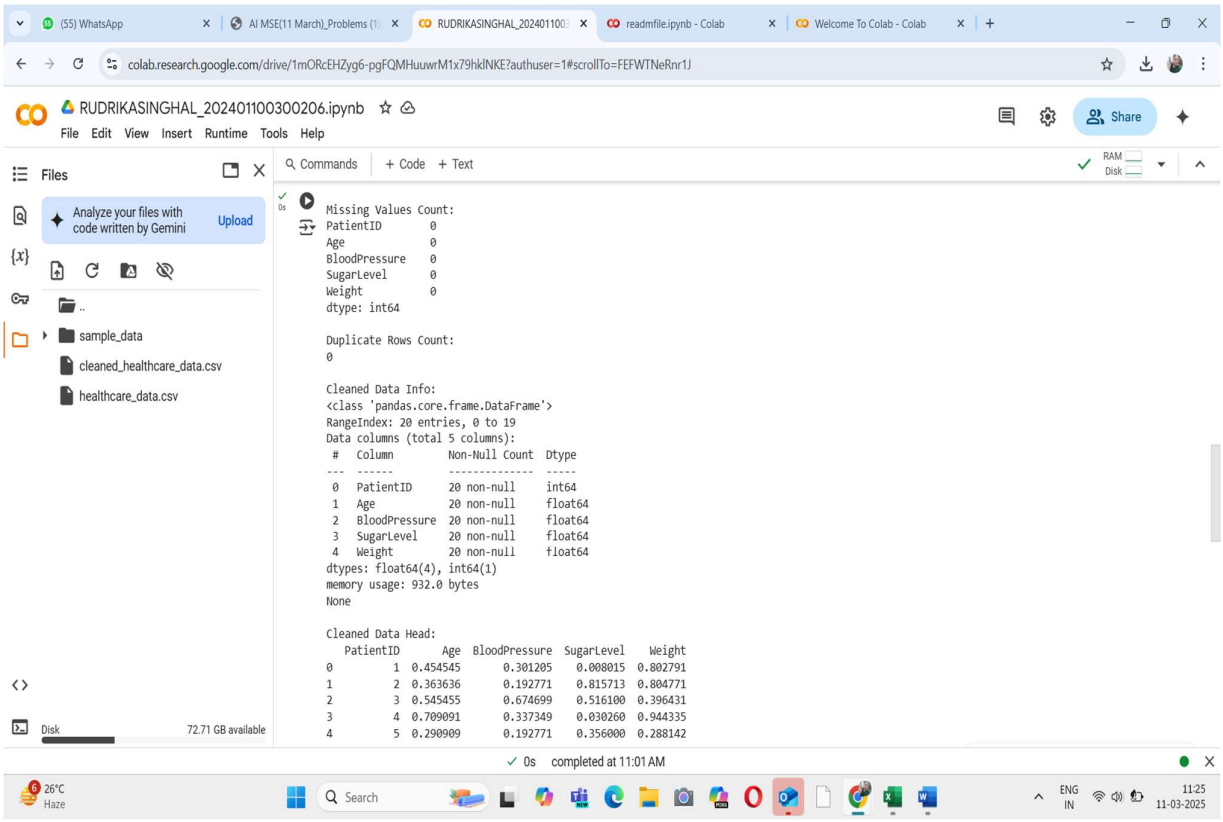
```
                180.5787961, 181.9725071, 181.7836075, 133.3857117,
87.00502726, 193.2727707, 135.9394821, 129.4112337,
125.4839575, 160.715853],
   'Weight': [105.5680341, 105.7034256, 77.78706964, 115.2447839,
70.38379045, 119.0503564, 62.17751536, 81.79225909,
94.63736848, 118.5939808,
          103.5846551, 61.45498223, 50.68483484, 113.1866322,
84.93857601, 77.71503786, 106.5759888, 83.30042553,
74.08193839, 111.8656975]
})

# Display basic information about the dataset
print("Initial Data Info:")
print(data.info())
print("\nInitial Data Head:")
print(data.head())

# 1. Handling Missing Values (if any)
# Check for missing values in each column
print("\nMissing Values Count:")
print(data.isnull().sum())

# In this case, there are no missing values, but if there were:
# For numerical columns, we would use the median to fill missing
values
```

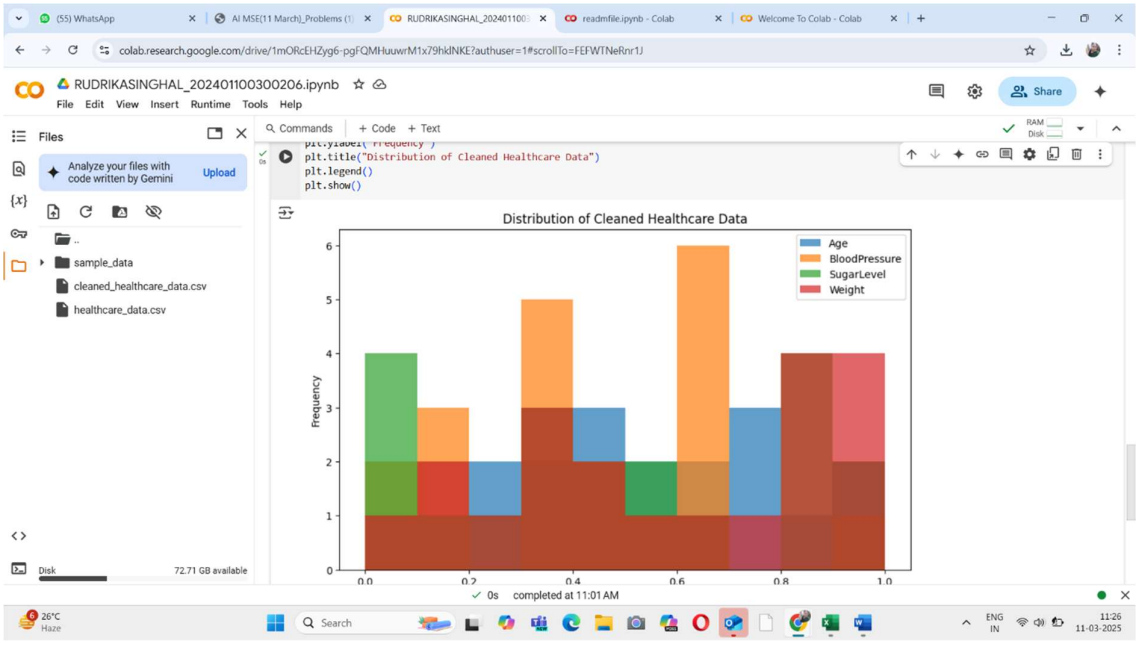
```
# data['BloodPressure'].fillna(data['BloodPressure'].median(),
inplace=True)

# For categorical columns, we could use the mode (not needed here)

# 2. Handle Duplicates

# Check for duplicates in the dataset

print("\nDuplicate Rows Count:")

print(data.duplicated().sum())

# Drop duplicates if any

data.drop_duplicates(inplace=True)

# 3. Normalize Numerical Data (Min-Max Scaling)

# Normalize the 'Age', 'BloodPressure', 'SugarLevel', and 'Weight'
columns using Min-Max Scaling

scaler = MinMaxScaler()

# Apply scaling to numerical columns

numerical_columns = ['Age', 'BloodPressure', 'SugarLevel', 'Weight']

data[numerical_columns] =
scaler.fit_transform(data[numerical_columns])

# 4. Display Cleaned Data Info and First Few Rows

print("\nCleaned Data Info:")
```

```
print(data.info())
print("\nCleaned Data Head:")
print(data.head())

# Save the cleaned data to a new CSV file
data.to_csv('cleaned_healthcare_data.csv', index=False)
# 5. Generate Graphs to Visualize Cleaned Data
plt.figure(figsize=(10, 6))
plt.hist(data['Age'], bins=10, alpha=0.7, label='Age')
plt.hist(data['BloodPressure'], bins=10, alpha=0.7,
label='BloodPressure')
plt.hist(data['SugarLevel'], bins=10, alpha=0.7, label='SugarLevel')
plt.hist(data['Weight'], bins=10, alpha=0.7, label='Weight')
plt.xlabel("Normalized Values")
plt.ylabel("Frequency")
plt.title("Distribution of Cleaned Healthcare Data")
plt.legend()
plt.show()
```

SCREENSHOTS OF OUTPUT:



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File Edit View Insert Runtime Tools Help
Share
Files
Analyze your files with code written by Gemini
Upload
sample_data
cleaned_healthcare_data.csv
healthcare_data.csv
Disk 72.71 GB available
Commands + Code + Text
plt.title("Distribution of Cleaned Healthcare Data")
plt.legend()
plt.show()
Distribution of Cleaned Healthcare Data
Age
BloodPressure
SugarLevel
Weight
Frequency
0s completed at 11:01 AM
26°C Haze
Search
ENG IN
11:26 11-03-2025